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ABSTRACT

This report is a revised edition of "CERL Report X-2" (May, 1968) of the Computer-Based Education Research Laboratory. It includes a brief history of the development of the computer-controlled teaching system, PLATO, a subject area listing of those written from 1968-1970, a chronological listing of the publications of the PLATO system and its applications, and a reference bibliography for those programs for which reports have been published. The program and lesson descriptions include the names of the persons responsible for the programs and the courses in which the lessons have been used. (Author/FL)

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A DESCRIPTIVE LIST OF PLATO PROGRAMS 1960-1970

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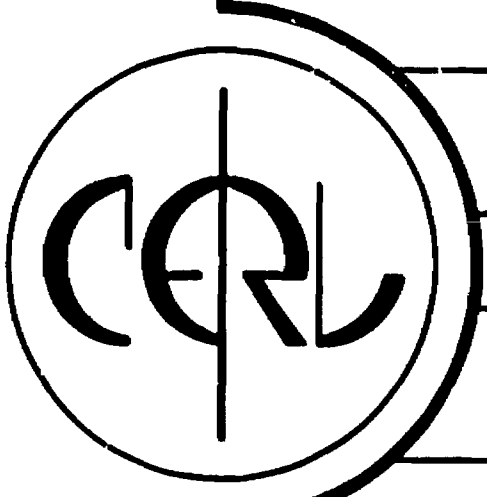

Computer-based Education Research Laboratory

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Distribution of this report is unlimited.

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Introduction

From 1960-1967 a computer-based teaching system called PLATO (Programmed Logic for Automatic Teaching Operations) was developed in the Coordinated Science Laboratory at the University of Illinois in order to explore the possibilities of automation in individual instruction.[13,14,16,17,18,25,26,39] In the course of development during those first seven years about 300 programs (using about 60 logics and including 181 lessons) were written for the system to illustrate or demonstrate its flexibility for teaching as well as for educational and other research.[40]

In January, 1967, the University of Illinois organized the Computer-based Education Research Laboratory for the PLATO project. The laboratory has continued the work on the educational aspects of the PLATO teaching system with particular emphasis on the most efficient use of the present system (PLATO III) and on the development of an economical large-scale computer-based educational system (PLATO IV).[1,20,8,21]

The PLATO system utilizes a high speed digital computer as the central control element for teaching a number of students simultaneously. The rules governing the teaching process are included in the program read into the central computer. A complete set of rules is referred to as a "teaching logic." In the course of development of the PLATO system, many logics were experimented with such as tutorial, inquiry, drill, conversational, simulation, etc. In the effort to permit maximum flexibility in the system, storage of lesson material on magnetic tape was abandoned for disk file storage, and a basic interpretive and interactive program was written which includes a flexible author language and editing capability.[9] The author language (called TUTOR) adapts to a wide variety of teaching styles. The TUTOR language allows time-sharing of the system, not only by students (as in the past), but also by authors, or authors and students simultaneously, thus utilizing the computer and the available terminals as efficiently as possible. With the advent of TUTOR, the proliferation of lesson material has increased rapidly. As of May 15, 1970 the total number of programs which have been written for the PLATO system since 1960 is over 900 of which 792 are lessons with about

500 being available for use at the present time. Some University of Illinois students have now completed four consecutive semesters of study using the PLATO system.

This report is a revised version of CERL Report X-2.[40] The first section is a brief chronology of the development of PLATO. The second section is a historical listing (with brief descriptions) of programs and lessons written, prior to TUTOR, for the first three versions of the "hardware" of the system: PLATO I, PLATO II, and PLATO III. The programs produced during 1960-1968 were classified in report X-2 into four groups: teaching programs, research programs, demonstration programs, and service programs. In this report the programs are regrouped into subject areas so as to be consistent with the listing of the 1968-1970 programs. At the present time the only 1960-1968 teaching programs still being used which are not written in the TUTOR language are those comprising the course in Maternity Nursing.[23,24] These lessons are written for the logic called GENERAL which allows flexibility in lesson presentation, but not time-sharing for authors, or simultaneous use by authors and students.[41]

The third section in this report lists the lessons now available which are written in the TUTOR language. Since the language is so versatile, it is no longer practical to classify lessons according to teaching style. Combinations of teaching styles can be and are often combined in one lesson. The TUTOR lessons, therefore, have been grouped according to subject matter.

The fourth section of the report contains a chronological list of PLATO publications. The numbers in superscript scattered throughout the report, however, reference the alphabetical PLATO bibliography at the very end of the report.

I. A Brief Chronology of Development of PLATO

June 1960	First design for PLATO complete (single station consisting of keyset and CRT with provision for simultaneous display of computer-generated characters and photographic slides)
Fall 1960	PLATO goes into regular research operation (2 hours per day using ILLIAC I computer) as project of Coordinated Science Laboratory.
November 1960	First formal demonstration of PLATO in operation
January 1961	PLATO II goes into operation (two stations operating simultaneously)
March 1961	First use of remote terminal with PLATO (30 miles from computer)
Spring 1961	PLATO first used with instructional material (high school math and French grammar)
Fall 1961	College level material first used on PLATO (Network Synthesis lessons)
Spring 1962	PLATO first used to provide part of accredited college course (Math 195, University of Illinois)
Summer 1962	Inquiry type logic developed for PLATO
November 1962	PLATO first used to collect and process physiological information (heart rate) as part of student response data.
January 1963	PLATO shifts from ILLIAC I to CDC 1604 computer
Spring 1963	PLATO first used to provide part of accredited professional course (Nursing)
Fall 1963	PLATO III first used (capability for expansion to 32 stations)
June 1964	Two different lessons simultaneously available to class using PLATO
October 1964	Provision for inter-terminal communication between PLATO terminals completed
Fall 1964	PLATO used for control of real experiments in physical sciences (all stations able to observe outcome and perform analyses of results)
December 1964	On-line editing of PLATO lesson possible while students use lesson
January 1965	CATO (Compiler for Automatic Teaching Operations) completed

Spring 1965	PLATO first used for extensive portion of accredited college course (EE 322)
Fall 1965	First college course (Library Science 195) given completely by PLATO
March 1966	Expansion of PLATO III to 20 terminals completed
May 1966	PLATO operating on own CDC 1604 computer
Summer 1966	Multiple author on-line tape editing program first used (MONSTER)
January 1967	Computer-based Education Research Laboratory (CERL) formed for continued operation of and research on PLATO
Summer 1967	TUTOR author language first used on PLATO (specifically designed for authors with no background in computer use)
March 1968	NSF grant awarded for first steps of development of PLATO IV (ultimately to consist of 4096 student terminals requiring only telephone line communication with a large central computer). Terminals are expected to use the plasma display panel developed at the University of Illinois instead of the more costly CRT presentation
June 1968	Disk storage added giving on-line editing capability to authors while students are operating (any combination of up to 20 authors or students simultaneously operating)
December 1968	14 station remote PLATO demonstration center in operation at Mercy Hospital (3 other centers operating by February, 1969)
June 1969	Multiple disk storage in operation. Up to 150 lessons available to student (for use) or authors (for editing) during a class session
November 1969	1 remote station operating at Springfield High School, Springfield, Illinois

II. PLATO Lessons and Programs 1960-1968

BIOLOGY

GENETI (PLATO III). Program for genetics problem-solving designed for use as a basic college genetics review. (Uses TUTOR logic). (Tenczar, Eades)

GENO (PLATO III). A simulated genetics laboratory for junior high school science students including an arithmetic computation facility for data calculations. (Easley, Millar)

COMPUTER-ASSISTED INSTRUCTION

DEMO (PLATO III). A program illustrating various possible functions of the keys of a PLATO keyset, written as a preface to some of the courses given on the PLATO system. (Uses GENERAL logic). (Bitzer, D., Walker, Lyman)[41]

TEACHER (PLATO III). A lesson designed to demonstrate the operation of the PLATO system to non-technical persons interested in preparing lessons for PLATO. (Fillman).

TALK (PLATO III). Short program to demonstrate communication between student stations. (Bitzer, D.)

CHEMISTRY

CHEM (PLATO III). Problems, information and review work in elementary chemistry. (Uses TUTOR logic). (Grandey, Bohn)

COMPUTER SCIENCE

Introduction to Automatic Digital Computing (PLATO II). Lessons comprising the first week of material taught in UI, Math 195: I. The Word as a Number; II. A. The Biquinary Code, B. The Storage Unit; III. A. The Arithmetic Unit, B. Instruction Format, C. The Control Unit, D. Execution of Single Instructions. Data collected from student runs provided material for studying the learning ability of each student, lesson effectiveness, and data rate requirements of the PLATO system. (3 lessons) (Braunfeld, Fillman)[25,26]

Introduction to Computer Programming (PLATO II). Instruction in programming for the ILLIAC computer written with PLATO tutorial logic. Chapter titles include: I. Number Representations; II. Binary Arithmetic; III. Negative Number Representation; IV. ILLIAC words; V. Introduction to the ILLIAC order Code (Part 1); VI. The ILLIAC Order Code (Part 2); VII. The ILLIAC Order Code (Part 3). (7 lessons) (Brown, R.)

Fortran Programming (PLATO III). Lessons on the Fortran programming language written for students in business and commerce in which the material is presented so as to be incorporated

eventually into a programmed textbook. (10 lessons) (Uses GENERAL logic). (Uretsky) 60, 41

DEMOGRAPHY

POPINC (PLATO III). Short lesson in population dynamics illustrating population growth. (Handler, Steinberg, L.)

ENGINEERING

Civil Engineering

CNTBMDS (PLATO III). An experimental program for on-line design of structures such as continuous beams. (Fenves, Norton)

Electrical Engineering

Network Synthesis (PLATO II). Two short lessons in network synthesis for electrical engineering students demonstrating circuit diagram construction by means of the PLATO keyset and a judging routine allowing a tolerance in numerical answers and a degree of freedom in the answer form. (Bachman).[11]

Maxwell's Equations (PLATO II). Introductory material on Maxwell's Equations for senior engineering students taking UI, EE 355: I. Introduction to Maxwell's Equations; II. Boundary Conditions at a Surface of Discontinuity; III. The Wave Equations in Free Space. (3 lessons) (Jordan, Lyman)

Circuit Analysis (PLATO III). Lessons written for use in conjunction with a University of Illinois course for junior electrical engineering students (UI, EE 322). The PLATO material has been presented seven semesters each time in a different manner with variations in either content, method of presentation, or amounts of material presented via PLATO. (Uses GENERAL logic). (Bitzer, D., Walker, M.)[18,37,41]

Circuit Analysis (PLATO III). A portion of the PLATO material for the circuit analysis course presented in the inquiry teaching style. (Johnson, R.)[37]

FOREIGN LANGUAGES

FORMAT (PLATO III). Inquiry approach to teaching modern foreign language reading skills providing literal and idiomatic meanings for a given text as well as pronunciations from phonetic translations and other relevant information for the student. (Myers, Payne)[45]

LANGOUT (Phonetics) (PLATO III). Programs designed to teach rules of pronunciation of French spelling using phonetic translation. (Uses TUTOR language). (Myers)

FRENCH (PLATO III). Drill and practice in translation of English sentences, phrases or words into a foreign language. Initially used for French. (Uses TUTOR logic). (Myers)

LATIN (PLATO III). Drill in Latin vocabulary and grammatical forms. (Uses TUTOR logic). (Scanlan)

LIBRARY SCIENCE

LIBUSE (PLATO III). 14 units comprising a one semester course, "An Introduction to the Use of the Library," for non-library science majors (UI, LIB SCI 195)[10,41] (28 1 hour lessons) (Uses GENERAL logic) (Axeen)

MATHEMATICS

Perimeter of Polygons (PLATO I, II, III). A simple geometry demonstration lesson on perimeters designed to illustrate all the features of the PLATO system (i.e., control keys, help sequences, judging, evaluating, etc.), updated for each new version of the PLATO system. (Braunfeld, Fillman)

Addition of Fractions (PLATO I, III). A demonstration lesson on fractions showing the use of the PLATO keyset and improvements (PLATO III version) in the flexibility of the teaching logic. (Fillman, Braunfeld)

ZOO (PLATO II). A second grade level mathematics demonstration lesson (with a zoo theme) written for primary school children visiting the PLATO project. (Lyman)

ARITH DRILL (PLATO III). Arithmetic drill sequences for low achievers from sixth and seventh grades. (Gilpin, J.)

ARRAYS (PLATO III). Four lessons for fourth grade pupils (about one hour each) using arrays of symbols. (Easley)

Things and Their Names (PLATO II). Two lessons in introductory secondary mathematics dealing with the subject of "Things and Their Names," designed for incoming sub-freshmen at University High School, Urbana, Illinois. (Wills)

BASES (PLATO III). A mathematics lesson designed to reinforce the mathematical concepts of bases (Uses TUTOR logic). (Rothbart, Lund)

DIST (PLATO III). Lesson used to reinforce mathematical concepts. (Uses TUTOR logic) (Rothbart, Lund)

TEST (PLATO III). Test on understanding of some mathematical concepts. (Uses TUTOR logic). (Rothbart, Lund)

GEOM1 (PLATO III). A lesson which introduces the keys used by a PLATO student to construct geometric figures on the screen. (Uses TUTOR logic) (Dennis)[27]

GEOM (PLATO III). Symmetry properties for triangles and quadrilaterals in which the symmetry properties are then used to discover standard Euclidean properties of

triangles and quadrilaterals. (15 lessons) (Uses TUTOR logic) (Dennis)[27]

SEQUENCES (PLATO III). Recursive definitions for high school students. (9 lessons) (Easley)

QUANTITIES (PLATO III). Test development and studies of quantitative aptitude in higher education students. (Stake)

PROOF (PLATO II and III). A program (with several versions) which enables students to compose proofs of mathematical problems in a logical manner, each solution or proof being judged only for violations in logic. The most recent version of the program allows for insertion of lemmas in the proofs. The program provides a system for collecting data on thought processes during mathematical problem-solving or for preparing instructional programs in the mechanics of rigorous mathematical proof. (Easley, Golden, Gelder)[28]

TEXT TESTER (PLATO III). A program designed to test new textbooks in which text materials are reproduced on slides with student answers inserted from the keyboard. Teacher comments and lesson modifications are also able to be inserted on line. TEXT TESTER has been used to present lessons in the following areas: a) Remedial Arithmetic from the University of Illinois Committee on School Mathematics 7th grade course (20 lessons); b) Politics Unit from experimental materials of the Social Sciences Curriculum Center (12 lessons). (Wilson, Golden, Easley, Coombs)

MATRIX (PLATO III). Sequence designed to teach step-by-step matrix manipulation. (Norton)

NURSING

MEDICARE (PLATO II). A lesson for student nurses in the care of a patient with myocardial infarction using an auxiliary film sequence to provide the background material for the problem posed the students. Student input provided data for analysis of each student's approach to the solution of the problem. (Bitzer, M.)[22]

IMNURSE (PLATO III). A 12-unit course in maternity nursing for use in a 2-year diploma nursing curriculum. Emphasis is laid on inquiry training techniques although material is also presented tutorially. The twelve units represent approximately 48 conventional classroom hours of lesson material. (Uses GENERAL logic). (Bitzer, M., Boudreaux, Bitzer, D., Lyman) 23, 24, 41

PHYSICS

MAKING THINGS MOVE (PLATO II). An elementary science lesson based on a second grade science unit written as a demonstration for primary school children. (Lyman)

ARCH (Archimedes) (PLATO II & III). A demonstration lesson using PLATO as a simulated laboratory in which experiments based on Archimedes' Principle can be performed. (Bitzer, D., Lyman)

REPLAB (Responsive Environment Programmed Laboratory) (PLATO II & III). A lesson in scientific inquiry based on the properties of a bimetal strip in which the students inquire into the physical phenomenon in order to describe, analyze, predict, control and explain it. Important data is provided from student input for the multi-dimensional analysis of the inquiry process. The lesson uses an auxiliary film sequence to show the bimetal strip experiment. (Suchman, Bitzer, D., Lyman).[19]

EXPERIMENT (PLATO III). A program which controls real-time on-line experiments in secondary emission surface physics study and immediately analyzes the experimental data, displaying the desired analysis on the PLATO screen. (Bitzer, D., Propst)

POLITICAL SCIENCE

POLIS (PLATO III). Problems in role-playing in American government and politics for use in U.I. POLI. SCI. 150. (Coombs, Grant)

DELPHI (PLATO III). Prediction game, part of "Mankind 2000" project. (Uses TUTOR logic) (Umpleby, Hicks)[51]

SECURITY GAME (PLATO III). Inter-nation simulation game. Is computerized version of a card game developed by C. E. Osgood. (Fehling)

EXPERIMENTAL PSYCHOLOGY

CHAOS (PLATO II). An exercise on number sequences written for use with the studies on physiological correlates of mathematical discovery in which student heart rates were recorded along with the lesson responses. (Easley, Avner, A.)[5, 6]

ORDER (PLATO II). A timed exercise in numerical pattern recognition (more simple than CHAOS) used with the studies on physiological correlates of mathematical discovery. (Avner, A.)[5, 6]

VERBOSE (PLATO III). A program making possible an elementary analysis, in real time, of a work chain generated by a subject's free association. (Hicks)[34]

PROGMAT (PLATO III). A program using PLATO to collect and analyze data on Raven's Progressive Matrices Test (non-verbal test of pattern-handling capabilities). (Gilpin, J.)

PAVLEW (PLATO III). (replaces CEWCODE) Basic program providing means of running verbal learning experiments on many subjects simultaneously under a variety of procedural, timing and materials conditions. (Webber)[42, 43, 44, 45, 46, 61, 62, 63]

CIRCLE (PLATO III). Program designed for use in the production with the PLATO system of short, animated films for a language-free test of interpersonal norms. Each film strip, or scenario, portrays an interpersonal intention composed of discrete sequences of visual events identified with abstract, theoretical components. (Osgood, Wilkins, Koo)

CONCEPT (PLATO III). A general concept attainment program allowing up to three logical types of concept rules and four methods of presenting stimuli. (Schwartz)[54]

COMICAT (PLATO III). (replaces GIN-1) A basic program permitting participants in group negotiations from PLATO stations to read, write, send and receive information, the sending and receiving under communication rules controlled by decision makers. (Singer)

VRBADV (PLATO III). A program designed to test C. E. Osgood's theory of meaning by satiating components of denotated meanings, the effects of satiation being demonstrated by disturbed performance on a non-related task. The program individually administers experimental sequences and allows measurements of latencies in situations where the speed of presentation is critical. (Osgood, Wilkins, Koo)[50]

VERB4 (PLATO III). Program to test attention control of subjects. (Anderson, R.)

SAT TWO (PLATO III). The second in a series of experiments testing Osgood's theory of meaning. (Osgood, Wilkins, Koo)[50]

SCRAMBLE (PLATO III). Program controlling experiment in discovery learning for a basic human learning study. (Rubovits)

KEYSET1 (PLATO III). A program to provide data for assessment of the relative efficiency of different configurations of the keys on the keyset input with input by long-hand writing. (Wearing, Walker, C.)

KEYSET2 (PLATO III). Sequence designed to test keyset entry devices. Measures length of time for subject input and error formats. (Wearing, Walker, C.)

READING

ALPHABAT (Alphabet Automatic Teaching) (PLATO III). A program designed for experimenting with the teaching by PLATO of the letters of the alphabet to two- and three-year old children. (Alpert, A.)

RHETORIC

SENFRAC (PLATO III). Remedial instruction in concepts, rules and techniques in rhetoric. (Uses TUTOR logic) (Gilpin, M.)

INSERT (PLATO III). Remedial instruction in concepts, rules and techniques in rhetoric. (Uses TUTOR logic) (Gilpin, M.)

STATISTICS

AUTOLAB (PLATO III). A simulated laboratory program introducing students to the techniques of collection, recording and analysis of data derived from measuring the stretch of springs. (Walker, M., Carss, Salinger)

SYSTEMS AND SERVICE PROGRAMS (PLATO III)

CATO. The PLATO compiler. (Singer, Secrest, Walker, M.)[33, 32]

MONSTER. Fast, flexible, time-shared editing system, allowing two PLATO users to edit CATO programs simultaneously using PLATO student terminals as input media. System includes subroutines for constructing PLATO FORMAT statements, and designing characters. (Krueger, Blomme)

TUTOR. The program which interprets and processes lessons written in the TUTOR author language and which allows interactive time-shared editing of PLATO programs. (Tenczar, originator; Blomme, et al., modifications)[9]

CATABLE. Diagnostic routine giving labelled dumps, ordinal numbers, and absolute starting addresses of significant items in a CATO program. (Krueger, Blomme)[33, 32]

SPECTRE. Simulation of subject sessions by rerunning the sessions as constructed from the recorded response data. (Bitzer, D., Singer, Secrest)[33, 32]

CHARPLT. Routine to allow on-line design and construction of PLATO program characters on the PLATO screen, output in proper format for character listing being written onto magnetic tape. (Krueger, Blomme)

SETPLOT and PLOTTER. Routines to prepare and output on the PLATO screen all information prepared by FORTRAN output statements (PRINT, WRITE, OUTPUT TAPE, PUNCH). (Blomme)

COMMENT. Program to sort student responses and print out comments. (Walker, M.)

DODAD. Diagnostic routine (giving labelled dumps of variables and subroutines) useful in debugging or interpreting CATO programs. (Kraatz)[7, 29, 30, 31]

NEWSORT. Analysis program for selecting subsets of stored response parameters in which all records of keypushes have common characteristics. Also provides point graphs of response parameters. Records and graphs are available on the PLATO display or as hard copy. (Norton)[7, 29, 30, 31]

NURD2. Program analyzes student responses for program GENERAL and prints history of events sorted by student, counting wrong answers, lapsed times, etc. (Kraatz)[7, 29, 30, 31]

TUDOPE. (replaces TEXTDOPE) Program presenting summary information about student responses to tutorial logic either on the PLATO display or as hard copy. Lists of student responses, response latencies, or histogram plots are available. (Kraatz)[7, 29, 30, 31]

CLASSIFY. Routine to search and classify response data for specified patterns of student input. (Tatsuoka, K.)[56]

CUMCURV. Routine reads a session of student responses and prints a cumulative response graph for each student. (Dollins)

EVALTLK. Intercommunication program providing hard copy of student or student-teacher discussion, particularly useful for recording course evaluation comments of students conversing with each other. (Hicks)[35]

MOVIE. Program allowing slide sequence presentations at optional speeds. (Millar)

TEACHING OF THE BLIND

TEXT EDIT (PLATO III). (Some versions called BRAILLE). A tutorial type teaching logic that permits textual slides, questions stored in memory and plotted on the "blackboard: and student inputs from an auxiliary device (such as a BRAILLE typewriter), as well as on-line editing. (Easley)

BLIND (PLATO III). Lessons in the use of the abacus designed for blind students. (Uses TUTOR logic and audio facility). (Weber, et al.)[64]

TECHNICAL TRAINING

URC-32 (PLATO III). Lessons in troubleshooting training for electronic technicians using an URC-32 transceiver. (Uses TUTOR logic) (Huggett)[36]

III. PLATO Lessons and Programs 1968-1970

ART HISTORY

MMA — Development of computerized guide to an art museum. Bury St. Edmunds Cross is being used as protype object. (Risser, Scheineman, Griggs)[12]

ASTRONOMY

PLANET — Planetary motion. Conic sections, gravity, planetary motion with laboratory approach. (Avner, E.) (UI, AST 1Ø1)

BIOLOGY

B1ØØKD — PLATO keyset demonstration for Biology 1ØØ students. (Arsenty)

B1ØØCB — Chemical bonding. Designed for use in Biology 1ØØ, 1Ø1. (Arsenty) (UI, BIOL 1ØØ, 1Ø1)

B1ØØMB — Chemical model building (carbohydrate models). (Arsenty) (UI, BIOL 1ØØ, 1Ø1)

R1ØØEA — Enzyme activity. (Arsenty) (UI, BIOL 1ØØ)

B1ØØCM — Cell metabolism. (Arsenty) (UI, BIOL 1ØØ)

B1ØØSV — Surface area/volume problems in organisms. (Arsenty) (UI, BIOL 1ØØ)

B1ØØDNA — Inheritance and DNA (Arsenty) (UI, BIOL 1ØØ)

B1ØØBL — Biogenetic law. Ontogeny recapitulates phylogeny. (Arsenty) (UI, BIOL 1ØØ)

B1ØØML — Terrestrialization. (Arsenty) (UI, BIOL 1ØØ)

B1ØØHM — Homeostatic mechanisms. Introduction to general cybernetic systems. (Arsenty) (UI, BIOL 1ØØ, 1Ø1)

B1ØØTT — Homeostasis in biological systems. (Tenczar) (UI, BIOL 1ØØ)

B1Ø1RB — Radiation biology. (Arsenty) (UI, BIOL 1Ø1)

B1Ø1PZL, B1Ø1LRN — Insight and manual learning through a puzzle to produce learning curve. (Arsenty) (UI, BIOL 1Ø1)

B1Ø1POP — Population growth study. (Arsenty) (UI, BIOL 1Ø1)

B1Ø1SEA — Quiz on production and pollution. (Arsenty) (UI, BIOL 1Ø1)

BKEYS Introduction to PLATO. Lesson serves as the introduction to PLATO lessons used by the School of Life Sciences. Students may go through a sequence teaching the function of each special key on the PLATO keyset. (Eades and Hyatt) (UI, BIOL 1ØØ, 1Ø1, 115)

EVOL1BC Introduction to evolution. An introduction to evolution covering concepts of adaption, teleology, vitalism and mechanism and a brief history of evolution. (Eades) (UI, ZOO 1Ø7)

CELDIV Cell division. An explanation of mitosis and meiosis including descriptions of the processes and explanations of their functional significance. Students may elect higher or lower level of presentation. (Eades) (UI, BIOL 115, ZOO 1Ø7)

GENINT Introduction to Mendelian genetics. An introduction to the terms required for basic Mendelian genetics. An explanation and practice in single locus inheritance (complete and incomplete inheritance). (Eades) (UI, BIOL 115, ZOO 1Ø7)

CDDICT Cell division and basic genetics. Definitions of terms used in cell division and basic Mendelian genetics. Lesson used in conjunction with CELDIV or GENINT. (Hyatt) (UI, BIOL 115, ZOO 1Ø7)

B1152AR Simulation of genetics laboratory problems. Students are asked to solve the modes of inheritance of traits observed in fruit flies. Students designate desired crosses and the computer generates offspring in accordance with laws of inheritance. (Eades) (UI, BIOL 115)

B115PA Genetics and evolution. Used with other lessons to analyze student answers and determine proper branching. (Eades, Tenczar) (UI, BIOL 115)

EVOL2A1, EVOL2A2 Comparative anatomy and embryology in evolution. Discussion and evolution of evidence from comparative anatomy and embryology in relation to evolution as opposed to separate creation. (Hyatt) (UI, BIOL 115, ZOO 1Ø7)

EVOL2A3 Chemical evidence for evolution. A survey of biochemical evidence supporting evolution. (Hyatt) (UI, BIOL 115, ZOO 1Ø7)

EVOL2A4 Serology in evolution. Explanation of the precipitin test and problem solving using the precipitant test to decipher phylogeny; the relevance of serology as evidence for evolution. (Eades) (UI, BIOL 115, ZOO 1Ø7)

EVOL2B Origin of life. Review of historical explanations for the origin of life and development of current theories on composition of the early attempt and struggles in the development of life. (Eades) (UI, BIOL 115, ZOO 1Ø7)

EVOL2C Biogeology and evolution. Discussion of biogeology as evidence for evolution, especially with respect to the marsupials of Australia and Darwin's finches. (Eades) (UI, BIOL 115, ZOO 1Ø7)

EVOL3B2 Variation in natural populations. The sources of variation in natural populations of organisms, especially chromosomal aberrations. (Hyatt) (UI, BIOL 115, ZOO 1Ø7)

EVOL3E Long term evolution. Discussions of evolution over long time periods: especially orthogenesis and adaptative radiation. (Hyatt) (UI, BIOL 115, ZOO 1Ø7)

EVOL4A Primate evolution and human races. The history of evolution of the primates with discussion of morphological structures and selective pressures causing them; the fossil record of primitive man. Characteristics of the major races of man and discussion of the significance of racial differences in the context of evolution. (Eades, Hyatt) (UI, BIOL 115, ZOO 1Ø7)

EVOL4C, EVOL4D, EVOL4E Population explosion. Human population explosion and its implications; the operation of factors (especially behavioral factors) that limit natural populations and the ways in which man has overcome them. Modern simulation of progressively greater complexity illustrating population explosion when modern technology is introduced in underdeveloped countries. Discussion of the significance for the future man. (Eades and Hyatt) (UI, BIOL 115, ZOO 1Ø7)

B1153B, B1153B1, B1153B2 Illustration of evolution by natural selection through a series of population models based on the Hardy-Weinberg equilibrium equations. Lesson includes extensive model simulation in which the student plays the role of a bird searching for well camouflaged and poorly camouflaged moths randomly hidden on simulated tree trunks. (Eades, Hyatt) (UI, BIOL 115)

CHEMISTRY

General Chemistry

EQUI Equilibrium and balancing of chemical equations. (Bohn and Stepien) (UI, CHEM 1ØØ)

CFORMB, DFORMA (formerly STOIC, STOICA, STOICB) Permits students to study topics involved in calculating chemical formulas. Topics include moles, conversion factors, simplest formulas, formula weights and molecular formulas. (Grandey) (UI, CHEM 1ØØ)

CFORMQ Diagnostic quiz on chemical formulas. Branches students into proper place in CFORMA and CFORMB. (Grandey) (UI, CHEM 1ØØ)

EQUATA, EQUATB Provides instruction in solving stoichiometry problems. Stepwise development of method and general practice with specific helps. (Grandey and Muirhead) (UI, CHEM 1ØØ)

EQUAT Computer administered and graded quiz on stoichemistry with help for missed problems. (Grandey) (UI, CHEM 1ØØ)

REDOX, REDOXA Provides stepwise development of the method of balancing oxidation-reduction equations in acid or base. (Grandey) (UI, CHEM 1ØØ)

REDOXB Examination on oxidation and reduction. (Grandey) (UI, CHEM 1ØØ)

INTCHM Review of basic skills and techniques in use of exponential notation, conversion factors, graphing, and logarithms. (Muirhead) (UI, CHEM 1ØØ)

SLIDRU Introduction to basic skills needed to operate a slide rule. Includes provision for students to provide their own problems. (Muirhead) (UI, CHEM 1ØØ)

CHEM1, CHEM2 General chemistry problem-solving. Allows students to practice several types of problems with help provided for difficulties. Types of problems available: 1) calculating chemical formulas from percentage composition; 2) calculating percentage composition from chemical formulas; 3) calculating quantities from chemical equations. Students may choose computer-supplied problems or supply their own. In both cases, specific help is provided. (Grandey) (UI, CHEM 1ØØ, 1Ø1)

IQUAL1, IQUAL2 Inorganic qualitative analysis. Laboratory simulation, quiz and help units. (Francis) (UI, CHEM 1Ø8)

Organic Chemistry[55]

ALKENE Alkene chemistry. Introduction to the chemistry and nomenclature of alkene compounds. (Smith, S.) (UI, CHEM 133, 234)

ARENE2 Arene chemistry. Introduction to electrophilic aromatic substitution reaction of benzene and related compounds. (Smith, S.) (UI CHEM 234, 133)

QUAL, QUAL2 Qualitative Organic Analysis. Laboratory simulation of identification of unknown organic compounds. (Smith, S.) (UI, CHEM 338)

ORCHEM Organic chemistry. Introduction to the nomenclature and structure of organic compounds with emphasis on alkanes. (Smith, S.) (UI, CHEM 234, 133)

NMR, NMR2 Nuclear magnetic resonance. Introduction to the principles of proton nuclear magnetic resonance and the interpretation of nmr spectra of organic compounds. (Smith, S.) (UI, CHEM, 234, 336, 338, 432)

KETONES Organic chemistry. Condensation and addition reactions of aldehydes and ketones. (Smith, S.) (UI, CHEM 133, 234)

ROH Organic chemistry. Chemistry of aliphatic alcohols including physical properties, reactions and synthesis. (Smith, S.) (UI, CHEM 234, 133)

Analytical Chemistry

LOGIC Laboratory study of switching functions, logic gates and Boolean algebra. (Malmstadt) (UI, CHEM 383)

COMPUTER-ASSISTED INSTRUCTION

AUDIO CAI Demonstration. 1) Simulated spelling test demonstrating individualization of lesson material possible with PLATO's random-access audio system. (Avner, A.)[21] 2) Physics demonstration of quantum mechanics; Coulomb scattering and gravity effects. (Sherwood, B.)

DEMON Short demonstration sequences of some types of PLATO teaching capabilities. (Kraatz)

GDEMO Demonstration program. Duplication in TUTOR of old nursing demonstration lesson. (Maternity Nursing-INTRO) (Blomme)

INTRO Use of PLATO. Teaches use of PLATO keyboard to new students below college level. (Atwood)

TDEMO PLATO keyset orientation and demonstration lesson. (Tenczar)

COMPUTER SCIENCE

ANALOG Simulated analog computer demonstration. (Blomme, Bohn)

BASIK BASIC Computer Language. Lesson is designed to teach the fundamentals of the computer programming language called BASIC. It assumes no previous knowledge of computer programming. (Hyde)

FORTRAN, FORTRAN2 Basic FORTRAN commands. (Gooch)

SIMCOM Digital Computers. Simulates, at each station, a very simple, limited digital, decimal computer. Each instruction is broken down into a fetch step, an increment of program address, and several execute steps. Memory contents, register contents, and information flow is shown. (Steinberg, L.)

CIRCUIT Logic circuits laboratory. (Gooch)

CS1Ø1 Numerical methods adapted to computing machinery. (Hyde) (UI, CS 1Ø1)

DEMOGRAPHY

POPULA, POPULB, POPULC Introduction to basic demographic problems and routines to perform calculations and plotting (both rectilinear and bar graph forms) of various demographic variables. (Handler, Sherwood, J.)

ECONOMICS

ECON1 Review of static macroeconomic model of an economy without government. (Moyer and Paden) (UI, ECON 1Ø8)

ECON2, ECON3 Static model of ECON1 extended to include taxes and government expenditures, and a monetary sector with an interest rate. (Moyer and Paden) (UI, ECON 1Ø8)

ENGINEERING

Civil Engineering

CETEST Statics and elementary structural analysis. Civil engineering design laboratory. (Fenves, Nyman) (UI, CE 261)

Electrical Engineering

STEEL, EETEST, ELLAB Electrical Engineering Laboratory. Self-teaching electrical engineering laboratory including computer-monitoring and checking of instruments and circuit components. (Neal, Meller) (UI, EE 251)

EEL1 Electrical Engineering Laboratory. Signal waveforms and specifications, dial sensing of instruments by computer. (Mostafavi) (UI, EE 251)

EENET Network drawing. (Grossel) (UI, EE 26Ø)

EEDEMO Circuit theory. Introductory concepts. (Grossel) (UI, EE 26Ø)

Theoretical and Applied Mechanics

TAM15Ø, TAM15ØA, TAM15ØB Statics. Lessons deal with study of forces acting upon bodies such as simple structures, trusses and frames, with or without friction. (Elsesser) (UI, TAM 15Ø, 154)

FOREIGN LANGUAGE 4, 47, 48, 53

Chinese

CHINA11 Pattern drill on verbs of motion. (Chang)

English as a Second Language

ENGSEN1, ENGSEN2 Similar to verb drill programs listed under French for conjugation drills. English is the target language. (Frey)

French

Dialogues:

FMD1A....FMD2ØA French dialogues (23 lessons). Questions and drills on dialogues comprising 3 semesters of French. Translation English to French, grammar, substitution, questions on photographs, exercises dealing with basic French conversation. (Myers) (UI, FR 1Ø1-1Ø4)

MCON13-MCON19, M15, M2Ø Conversion drills using tape recordings. (7 lessons) (Myers, Shinall, Elliston) (UI, FR 1Ø1-1Ø4)

Demonstrations:

HEPLING French, Spanish, Russian, German, English. Multilingual random translation: French to Spanish; Spanish to German; German to Russian; Russian to German, etc. (Myers, Ariew)

FONORTH Student sees English word and is asked to transcribe it in French IPA. On an "OK" he is asked to give the French orthographic version of the word he has just transcribed. (Myers, Ariew)

MAUD Dictation 7, drill 1 with audio. Includes phonetic helps. Experimental demonstration. (Myers)

Phonetics:

KMP1-4, MK1-5 Practice in transcription of monosyllabic French words (drawn from minimal pair lists) into IPA French symbols. (4 lessons) (Myers) (UI, FR 313, 1Ø1)

KMFD, KMF1A, KMF1B, FLIST1, KMF2-19, PHON1-7 French phonetics. Basic rules of French phonetics with accompanying cognate examples, followed by sentences made up of these examples (phonseries). (21 lessons) (Myers) (UI, FR 313, 1Ø1)

KM1-5, KM6-7, KM8-9, KM1Ø, KM11-12 Review sequences for the KMF series. (5 lessons) (Myers, Ariew) (UI, FR 313)

FM2-8, FM11, FM12, FM15, FM18A, FM18B, FM19, FM20A, FM20B French orthographical dictations using tape recordings. Includes phonetic helps. (15 lessons) (Myers, Elliston) (UI, FR 101-104)

SALMBO Transcription of extended, unprogrammed French textual material into IPA French sumbols.

PHONDEF Definitions of phonetic terms. (Myers) (UI, FR 313)

Tests:

PFMTEST Multiple choice tests on dialogues and translations. (Myers, Bohn, Benouis) (UI, FR 101-104)

Translations:

KMMPVOC Drill on translation from English to French of minimal pair vocabulary items. Drill in providing French word that is defined in French (words drawn from minimal pair vocabulary items). (Myers)

MANUS1 Three types of exercises: directed responses, substitutions, translations from English to French.

MTR2-MTR21 Translations of English sentences to French sentences. (25 lessons) (Myers, Elliston) (UI, FR 101-104)

FMTERM Help for translation from English into French in MTR series. (Myers, Elliston)

MV2-MV22 Vocabulary review and practice. (9 lessons) (Myers, Elliston) (UI, FR 101-104)

Verb and Vocabulary Drills:

SENGN1-5, SENSYM1, RAV1 Verb conjugation drills using slides for concepts, symbols for utterance patterns. (7 lessons) (Myers, Ariew)[47, 48] (FR 101-104) (see also "Spanish" and "English as a Second Language")

AUTODID Vocabulary drill allowing teachers to input any desired vocabulary list. (Myers, G.) (FR 101)

Japanese

HIRAG1, HIRAG1A, HIRAG2B Hiragana characters. Transcription of Japanese words written in Hiragana syllabary characters into romanized alphabetic symbols. Translation of English words into romanized alphabetic symbols for Japanese equivalent and into Hiragana syllabary characters. (Myers, Kuo, Myers, G.)

Latin[53]

LATIN, LAT1-LAT9 Beginning Latin. Introduction to the simpler forms and elementary syntax of Latin. (Scanlan) (UI, LAT 1Ø1)

LAT2Ø-LAT19 Beginning Latin. Introduction to the more complex forms and syntax of Latin. (Scanlan) (UI, LAT 1Ø2)

LATHE, LAH2 "Help" lessons for LATIN-LAT19, ROME1-ROME31. (Scanlan) (UI, LAT 1Ø1, 1Ø2, 113, 114)

ROME1-ROME15 Review of Latin morphology and syntax. ROME1-ROME6 teaches and practices Latin cases; ROME7-ROME9 emphasizes pronouns and infinitives; ROME11-ROME14 emphasizes participles and gerunds. ROME6, ROME1Ø, ROME13, and ROME15 are tests. (Scanlan) (UI, LAT 113)

ROME16-ROME31 Review of Latin morphology and syntax. ROME16-ROME21 emphasizes basic subjunctive constructions; ROME23-ROME25 emphasizes conditional statements; ROME27-ROME30 emphasizes temporal, concessive, comparative, and causal clauses; ROME22, ROME26, and ROME31 are tests. (Scanlan) (UI, LAT 114)

VERG1-VERG8, VERG10 Latin questions which test the surface comprehension of Vergil's epic poem, the Aeneid. VERG1-2 checks comprehension of Aeneid, Book 1, VERG3-5 checks comprehension of Aeneid, Book 2. (Scanlan) (UI, LAT 3Ø6)

Russian

RUSS1-30 Russian language reading program with grammar lessons. (Curtin, Woodruff, Clayton) (UI, SLAV 4ØØ, 121)

Spanish

SPANGN1-4B Verb drills for Spanish. (7 lessons) (Ariew, Armengol) (UI, AP 1Ø3)

SPANTRI Prototype translation and vocabulary. (Armengol) (SP 212)

GAMES

BRIDGE1-BRIDGE3 Game of bridge. Instruction in game of bridge particularly with regard to point-count bidding; includes computer-generated bids and computer-permitted playing (i.e. 4 people at 4 terminals play; computer deals, scores, etc., but doesn't play). (Blomme)

TIC Tic-Tac-Toe. Computer-controlled game. Evaluation algorithm. (Bohn)

GEOGRAPHY

ENERGY, BUDGET Physical geography. An exercise in studying the earth--atmosphere energy budget. (Priggie, Lahey, LaValle)

GRAPHICS

GRAPHIC Computer graphics demonstration. (Gast)

PERSP Computer graphics showing plotting and rotating of objects seen in perspective. Designed for use in courses involving spacial concepts. (Dickinson)

HEARING RESEARCH

TRYTUT Presents patterns on an array of vibrators which contacts a single subject's finger tip. Used to examine the learning rate for tactile patterns and various physical parameters which affect the discriminability of various patterns. (Parry, Davis, Siegel)

MATHEMATICS

Elementary Mathematics

WASH Test and drill on basic facts, all operations; drill on 2-digit and 1-digit operands, all operations; drill on two 2-digit operands for addition and subtraction; numeration test on the order of numbers. (Steinberg, E.)[S2] (1st-4th grades)

NUM Practice filling in missing numbers on 100 chart; varied types of drill in counting and observing emerging number patterns. (Steinberg, E.) (2nd grade)

ARITHB Drive units for: judging answers, directory for order of student tasks, tallying data; units used repeatedly on succeeding lessons. (Steinberg, E., Avner, A.)

ARITHC Introduction to PLATO, addition (sums 1-5) and subtraction, elementary functions and numeration. Essentially it is a review of 1st grade arithmetic and extension of that knowledge for open-ended questions. (Steinberg, E.) (1st grade)

ARITHD Numeration (counting backwards, work with 100 chart, relations, guessing game 1-25); addition (sums 9 or less) and subtraction; word names of numbers, counting and adding tens and applications to dimes. (Steinberg, E.) (2nd grade)

PLACE Diagnostic placement test. Adding a 1-digit to a 2-digit number by counting. (Steinberg, E.) (2nd grade)

COMP Drill on addition and subtraction facts by illustrative methods (stair steps, adding machines, etc.), and 2-step thinking. (Steinberg, E.) (2nd and 3rd grades)

ADCOUNT Two developmental lessons: 1) adding can be accomplished by counting as well as by usual algorithm; includes game similar to NIM, 2) adding 1 digit numbers whose sum is 10-14 can be done by first adding up to 10 and then adding remainder. (Steinberg, E.) (3rd grade)

STRAT Arithmetic exercises requiring some sort of strategy such as games of NIM or computations that look hard, but can be done mentally. (Steinberg, E.) (3rd-6th grade)

DIST Counting by tens; simple method for multiplication by powers of 10. (Rothbart)[52] (5th grade or UI, MATH 2Ø1 for math teachers).

DECI A non-fractional approach to decimals. (Rothbart, Braunfeld) (6th grade)

MENT Drill on application of elementary number properties to facilitate arithmetic computations. (Rothbart) (Upper elementary grades or UI, MATH 2Ø1 for math teachers.)

High School Mathematics

BASES Introduction to number bases other than base 10 system. (Ryan) (HS or post HS)

GEMOØ, GEMO7, GEODRIV Lessons introducing symmetry properties for triangles and quadrilaterals and then using symmetry properties to discover standard Euclidean properties of triangles and quadrilaterals. (Dennis, Bohn) (HS)[27]

MATHS1 Program for judging algebraic expressions. (Bohn)

SPRING, SPRING1 Mathematics problem research by students of Springfield High School. (Dulle, Hill, etc.)

College Mathematics

ADD, SUB, MULT, DIV Description and derivations of the four arithmetic algorithms from elementary properties of the natural numbers. (Rothbart) (Lund for DIV) (UI, MATH 2Ø1)

TEST Diagnoses proficiencies and inadequacies in computational skills of prospective teachers. (Rothbart, Lund, Phillips) (UI, MATH 2Ø1)

ALG, SGNDNO Lessons for college students with weak mathematical backgrounds. Demonstrations involving the number line with drills. (Dillon) (PARKLAND, MATH 9Ø)

INTALG, ALG2 Introduction to algebra. (Dillon) (PARKLAND, MATH 9Ø)

INTEGRAL Introduction to Integral Calculus. (Gooch) (College)

CAHILL Introduction to vectors. (Cahill) (College)

NURSING [23, 24]

Maternity Nursing

MAT1D, MAT1D-A Physiology of pregnancy, third trimester. Same as INNURSE, Lesson 1D, but programmed in TUTOR language. (Bitzer, M., Boudreaux, Lyman)

Pharmacology

APOTH, METRIC, HOUSE, DOSE, PHEQU Pharmacology Unit 1, Mathematics of drugs and solutions. After completion, students should be able to compute equivalent dosages of medications using metric, household and apothecary systems of measurement and solve problems related to drug and solution dosages. (Bitzer, M., McManus, Lyman)

DRUGS, DRUGS1 Pharmacology Unit 2, Principles of Drug Therapy. Students learn to recognize fundamental principles of drug therapy and identify factors which influence dosage, action, metabolism and absorption of drugs. (Bitzer, M., Boudreaux, Lyman)

DCLSX General introduction to Pharmacology Unit 3, Major Drug Classifications. Includes quiz on names of major drug groups. (Bitzer, M., Boudreaux)

DCLAS-DCLAS4, DCLS, DCLS2A, DCLSB, DCLS2B, DCLS2C Students learn to identify major drug classifications, recognize principles of drug classifications, classify commonly used drugs into proper drug classification given their drug action, identify bodily effects of drugs, recognize toxic symptoms of commonly used drugs, etc. (Bitzer, M., Boudreaux, Lyman)

PATC Pharmacology Unit 4. Applications of Units 1-3 of pharmacology to patient care problems in simulated patient situations emphasizing individual differences of patients, toxic symptoms, etc. (Bitzer, M., Boudreaux, M.)

PHYSICS

BALLS Scattering of hard spheres. Examples of scattering used to develop concepts of conservation of momentum (in 2 dimensions), center-of-mass coordinate systems, impulses and collisions. (Parry) (College)

BAS, BAS2-5 Introductory college physics. Mechanics for science and engineering students. Relationships among distance, velocity, acceleration and time, including numerical integration of Newton's laws of dynamics. (Sherwood, B.) (UI, PHY 1Ø6)

DGS1 A lesson on motion. (Tenczar, C.) (College, non-science majors)

NEWTON Newton's laws of motion as illustrated by the "elevator" problem. (Lyman) (HS or college)

POLITICAL SCIENCE

Introductory Political Science

CANDI One of a number of role-playing lessons supplementing introductory political science. Each lesson emphasizes a unique type of political environment and is followed by a lesson emphasizing cognitive skills in analyzing those environments. This lesson concerns electoral behavior of a congressional candidate. (Coombs, Zais) (UI, POL SCI 15Ø)

CHIEF Lesson concerns civil liberties. (Coombs, Zais) (UI, POL SCI 15Ø)

CHRMN Lesson concerns a legislative chairman and the steps to getting a bill passed by Congress. (Coombs, Zais) (UI, POL SCI 15Ø)

PRESI Lesson concerns presidential decision-making in foreign affairs. (Coombs, Zais)

AMGT2 Concepts of voting and candidate behavior. (Coombs, Zais) (UI, POL SCI 15Ø)

Technology and Society

DELPHI1 - DELPHI4 An exploration used to introduce students to possible future social and technological developments and to obtain estimates of the desirability of these developments. Alternative developments are explored by an "investment" technique. (Umpleby, Briggs, Lamont)[38, 51, 57-59] (College)

PSYCHOLOGY

Experimental

ABC, LOVEXP Experiment on perception designed to assess the ability of individuals to obtain the state of a multidimensional stimulus under restricted information. (Love)

AMI Experiment on human recall. (Montague, Helgoe, Nelson, Andre)

FRL Experiment designed to study organizational retroactive inhibition in free recall learning. (Anderson, Andre)

IKAD Psychological testing. Program designed to facilitate the testing of input rates and accuracy of two different keysets. (Goldhor)

MISFAC Missile Factory game used for experimental social psychological research on behavior in a mixed motive game. Tests theory of effect of cooperative strategy on naive subject playing international relations (Prisoner's Dilemma) game against another subject. (Hornik)

MYOCAR, MYO2 Medicine. Teaches aspects of the diagnoses of myocardial infarction. Used as material to test various feedback contingencies and other variables in programmed computer-based instruction. (Andre, Kulhavy)[2]

PAIRAS Experiment in paired-associate learning using the anticipation method. (Anderson, Andre)

PG1 Program on population genetics proposed by Biological Science Study Curriculum. Used in research on feedback procedures in PI and CAI. (Anderson, Andre, Kulhavy)

PSYEXP Experimental psychology. Contains procedure and routines for a general multitrial free recall and for paired associate presentation and scoring program. (Anderson, Andre)

PUZZLE Experiment presenting words and words with missing letters. Student attemps to fill in the missing letters. Each answer is judged and student continues guessing until word is completed or 60 seconds expires. Latency measures are recorded. (Smith, Sara)

RECMEM Experiment in which words are presented at 5 second rate and the student indicates whether or not the word was previously presented in the list. Latency and accuracy measures are recorded. (Smith, N. R.)

REINF Simulated laboratory allowing student unlimited experimentation with operant conditioning techniques. Read-time model of a simple organism is presented by the computer, conditioning, extinction, satiation, forgetting and other major types of behavior typically observed during operant learning may be observed. (Avner, A.)

SOLV Human learning and problem-solving of verbal material. General program enabling one to use it for many variations with simple variations. Good subject-experiment interaction and recording of data. (Cohen)

TONES Program designed to look for changes in auditory threshold as a function of task performance. The tasks are in the area of visual attention and cognition. (Cancro, Gast)

VERLER1 Part of continuing series of research investigations of organization processes in free recall and verbal learning. This unit studies organizational interference in free recall learning. (Anderson, Andre)

VERLER2 Fourth study in organization and forgetting of verbal material. Differential effects of response unlearning and response competition in a paired associated retroactive inhibition paradigm. (Anderson, Andre, Lawrence)

Instruction See STATISTICS-ANOVA, STXDRL

READING

READ Reading development drills. (3rd grade) (Golden, Powell, Blohowiak)

SEMANTICS

LAD Language acquisition device. Tests hypothesis of semantic structure by simulation of semantic processing of natural language input. (Adams)

SERVICE PROGRAMS

SERVICE Program containing generally useful service routines for TUTOR users, such as character-designing program. (Blomme)

STATISTICS

ANOVA Introductory sequence of analysis of variance for experimental psychology course. (Montague, Andre, Kaess)[3] (UI, PSYCH 331, 235)

LEXPO Elementary statistics. Semi-discovery approach to four basic rules of exponents. (Travers) (UI, ED PSY 39ß)

SSAM Elementary statistics. Forms randomly selected samples from a population of integers. Calculates mean and standard deviation of the samples. (Travers) (UI, ED PSY 39ß)

SIGMA Elementary statistics. Use of summation notation. (Travers) (UI, ED PSY 39ß)

STXDRL, PSYSTX Gives students opportunity to explore statistical concepts by actually "playing" with data. (Grossman) (PARKLAND, PSYCH)

COMPUTE 1) Statistical service package allowing direct computation of descriptive statistics, standard parametric statistics and binomial probabilities from data entered from a PLATO station; 2) Statistical demonstration package showing Central Limit Theorem, relation between mean and variance for different distributions, and approximation to Chi-Square distribution by computer-generated random sampling. (Avner, A.)

PSYCH Psychological and educational statistics service program. Provides rapid on-line determination of product-moment correlation coefficients and various statistics used in parametric tests of significance of differences in means. (Atwood, Avner, A.)

SIMTST Simulated high school algebra class test construction with resultant data and item by item analysis of scores. Designed for application to student teaching methods. (Steinkellner) (UI, ED 241)

TECHNICAL TRAINING

URC-1, URC-2, USN Navy training course. Radio transceiver operation and troubleshooting with interaction between transceiver and the PLATO terminal allowing input by PLATO of "faults" into transceiver, and sensing of manipulation of transceiver controls by the student. Tests students' ability to troubleshoot "faults." (Huggett, Davis, Rigney, Avner, A., Atwood)[36]

VETERINARY MEDICINE

NEURO First year veterinary medicine. Basic organization of peripheral nervous system; pathways mediating reflex behavior. (Safani) (UI, VBS 305)

IV. Chronological List of PLATO Publications

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13 ABSTRACT

This report is a revised edition of CERL Report X-2 (May, 1968) of the Computer-based Education Research Laboratory. It includes a brief history of the development of the computer-controlled teaching system, PLATO, a subject area listing of the PLATO programs written from 1960-1968, a similar listing of those written from 1968-1970, a chronological listing of the publications on the PLATO system and its applications, and a reference bibliography for those programs for which reports have been published. The program and lesson descriptions include the names of the persons responsible for the programs and the courses in which the lessons have been used.

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